



Independent Authority  
for Fiscal Responsibility

Opinion

13 July 2017

# Opinion on the determination of the 2017 Pension Revaluation Index (PRI)

The mission of AIReF, the Independent Authority for Fiscal Responsibility, is to ensure strict compliance with the principles of budgetary stability and financial sustainability contained in article 135 of the Spanish Constitution.

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## Executive Summary

On the basis of the analysis it has conducted, AIReF has been able to conclude that contributory pensions should be increased by the minimum 0.25% rate in 2017, as stated in the Stage General Budget Law for 2017. AIReF has to issue an opinion on the figures used by the Ministry of Employment and Social Security (MEySS) in Spain to determine the applicable Pension Revaluation Index (PRI) for each year. AIReF has to determine if the values used to calculate the PRI included in the State General Budget (SGB) draft are realistic and if the PRI calculation formula is applied correctly.

**The improvement in the transparency of the information provided by the MEySS for the PRI calculation is viewed very positively.** For the first time, and as stipulated in the current legislation, the General State Budget draft includes the information necessary to calculate the PRI in the Economic and Financial Report on Social Security. In addition, the MEySS has sent AIReF more detailed data from the relevant series and an analysis of the sensitivity of the social contributions to the macroeconomic environment. Although its content should be further detailed, given the expected evolution of income and expenditure from the pension system in the medium term, the method applied by the Ministry is considered adequate to project the PRI with limits applicable in 2017.

**The effective PRI (within the legal limits) is maintained at the legal minimum in the medium term in the absence of measures.** Under the assumptions used by the Ministry and AIReF, the effective PRI does not exceed 0.25% during the 2018-2022 period. For 2017, the revenue forecast is outside the confidence bands of the AIReF models, while the expenditure forecasts are more realistic. However, as the projection period advances, the probability of the officially forecasted growth in revenue materializes. In terms of the deficit, the MEySS forecast is considered very unlikely during the 2017-2018 period, although the relative optimism with respect to the AIReF models decreases as we approach 2022.

**The MEySS projects a theoretical PRI (outside the legal limits) of -3%, consistent with the AIReF estimates.** In addition, if the Ministry resolution method was applied but the values projected by AIReF were used, we would obtain a 2017 PRI of 3.5%. Finally, if AIReF forecasts are used with the iterative resolution method, without taking into account the thresholds defined in the Law, the computed 2017 PRI would be 2.9%. In all cases, the PRI obtained is close to the -3% and less than the 0.25% included in the current legislation as the minimum increase applicable to Social Security and civil service contributory pensions.

In order to continue this improvement in transparency, AIReF has made several proposals.

### Proposals:

#### 1. Complete the information provided:

- a. *Provide the macroeconomic series used, in order to replicate the central revenue evolution scenario, as well as alternative scenarios.*
- b. *Detail the computation of the historical substitution effect and the forecast model of the future substitution effect.*





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## 1. Introduction

AIReF has to issue an opinion<sup>1</sup> on the figures calculated by the MEySS in Spain to determine the Pension Revaluation Index (PRI) for each year. This Opinion paper complies with that legal remit in line with AIReF's Resolution 25, containing the content and methodology for the Opinion.<sup>2</sup> The aim of this Opinion is to determine whether the values used to calculate the PRI included in the 2017 State General Budget (SGB) draft are realistic and if the PRI formula is applied correctly.

This Opinion paper is divided into five sections including this introduction. First, the formula for calculating the PRI is reviewed. The second section describes the information provided by the MEySS to determine the PRI and some possible improvements are considered. The third section presents the results of the PRI with legal limits according to the MEySS and AIReF calculations, emphasizing the sources of divergence between both estimates. The fourth section presents the results for the PRI without limits, again for the MEySS and AIReF. Finally, this opinion's main conclusions are collected and proposals for improvement are formulated.

## 2. Description of the PRI formula

Social Security contributory pensions in Spain – including the minimum pension entitlement – have to be increased at the start of each year on the basis of the Pension Revaluation Index (PRI), as provided in the corresponding Law on the SGB. Article 58 of the General Law on Social Security (RDL 8/2015) establishes that the PRI, applicable from 1 January 2014 to Social Security and civil service contributory pensions (*Clases Pasivas del Estado*), including the amount of the minimum pension, is determined according to the following mathematical formula<sup>3</sup>:

$$IRP_{t+1} = \bar{g}_{I,t+1} - \bar{g}_{p,t+1} - \bar{g}_{s,t+1} + \alpha \left[ \frac{I_{t+1}^* - G_{t+1}^*}{G_{t+1}^*} \right]$$

Explanation:

$t+1$  = Year for which the revaluation is calculated.

$\bar{g}_{I,t+1}$  = Moving arithmetic mean centred on  $t+1$ , of eleven values of the rate of change of the revenues from the Social Security system.

$\bar{g}_{p,t+1}$  = Moving arithmetic mean centred on  $t+1$ , of eleven values of the rate of change of the number of Social Security contributory pensions.

<sup>1</sup> This obligation is established in Article 23 of Organic Law 6/2013 on the creation of the AIReF and Article 22 of Royal Decree 215/2014, which approves its Organic Statute, as in Article 58 of Royal Legislative Decree 8/2015, of October 30, which approved the consolidated text of the General Law on Social Security.

<sup>2</sup> [Resolution 25 on the Pension Revaluation Index](#)

<sup>3</sup> A detailed description of this formula can be found in [Annex 1 of the 2015 Opinion on the Pension Revaluation Index](#)

$\bar{g}_{s,t+1}$  = Moving arithmetic mean centred on t+1, of eleven values of the substitution effect expressed by both. The substitution effect is defined as the interannual variation of the average pension in one year, in the absence of that year's revaluation.

$I_{t+1}^*$  = Moving geometric mean centred on t+1 of eleven values of the amount of revenue from the Social Security System.

$G_{t+1}^*$  = Moving geometric mean centred on t+1 of eleven values of the amount of expenditure of the Social Security System.

$\alpha$  = Parameter of the speed of correction of the structural imbalance between revenue and expenditure, which will take a value between 0.25 and 0.33. The value of the parameter will be reviewed every five years. During the 2014-2018 period, the alpha value will be 0.25.

In no case may the result obtained lead to an annual pension increase less than 0.25%, nor greater than the percentage variation of the CPI in the annual period prior to December of year t plus 0.50%.

**The formula is designed to guarantee in the long-term the financial equilibrium of the contributory part of the Social Security system.** The PRI that results from the application of the formula guarantees the equilibrium between revenue and expenditure, and so endows the contributory segment of the system with long-term stability.

**The first part of the PRI formula relates to the average evolution between the revenue and expenditure components.** This allows the average annual growth rate of Social Security revenue (mainly social contributions and transfers from the State to finance supplementary pension minimums) to match the average evolution of the main determinants of pension expenditure: the number of contributory pensions, the substitution effect and the revaluation of current pensions (PRI). This component allows the revaluation to evolve without generating imbalances between revenue and expenditure in the long term.

**The second part takes into account the relationship between the structural level of revenue and expenditure.** The interrelation of the alpha correction factor and the structural gap between revenue and expenditure (defined around a mobile geometric mean) allows adjustments through slight increases or decreases in the case of a surplus or deficit. When the system is in structural equilibrium, it has not effect on the year's PRI calculation.

**The figures for each of the variables used in the formula are calculated as the average of the 11-year values to smooth the effects of economic activity on the PRI.** This 11-year average, centred on the year, limits the effect of the economic cycle on each of the variables used and, therefore, on the formula's result. In this manner, the pension revaluation is prevented from being excessively low in recessions (when contributory revenue is moderated and the increases in new pensioners and the number of pensions are accelerated) or from being elevated in expansionary years, leading to a smoother profile of the PRI evolution.

### 3. Analysis of the available information

#### 3.1. Available information

**AIReF highly appreciates that the 2017 State General Budget (SGB) draft includes for the first time information on the calculation of the PRI.** Following the recommendations proposed by this institution in various reports and opinions, the Social Security Financial Report included in the 2017 SGB draft incorporates both the values used to calculate the PRI and the result obtained before applying the minimum limit of 0.25%.

**The published information details the revenue and expenditure components for each of the years during the 2012-2017 period. However, in the future, it will not include the annual projections, but rather the average expected variation in the 2017-2022 period.** For each of the years during the 2012-2017 period, the breakdown of the revenue and expenditure to be considered in the PRI calculation is detailed. For 2017-2022, no annual frequency values are detailed, but only the expected average for the period of revenue, expenditure, number of pensions and substitution effect.

**Subsequently, the MEySS has provided more detailed information, which is highly appreciated. AIReF proposes that this information be published in future SGB drafts, since it is essential to achieve the replicability of the MEySS calculations.** Regarding revenue, during May and June, AIReF received information on large revenue items for each of the forecast years, a limited description of the modelling of the contributory forecast, and some variables of the macroeconomic scenario underlying its forecasts. This scenario includes the forecast of nominal GDP growth and two possible scenarios on the unemployment rate: one more prudent, where the unemployment rate evolves from 17.6% in 2017 to 13.1% in 2022; and another more optimistic, where this variable decreases from 17.5% to 11.4% over the same period. Regarding expenditure, the MEySS has submitted to AIReF information on the main Social Security expenditure items up to 2022, including the number of pensions and the substitution effect. In addition, it has provided series up to 2060 of the number of pensions and the number of new pensioners, distinguishing by type of pension, as well as the projected mortality tables for the pensioner population. However, information has not been provided on the new pensioner forecast, relative to assumptions or methodology, that is sufficient to replicate the calculations and make a valuation. In addition, the MEySS has briefly explained the method to resolve the PRI formula. The main MEySS series for the PRI calculation are presented in table 1, in a later section.

#### 3.2. Possible improvements in the information provided

Having acknowledged the progress made this year in the amount of information published and received, below AIReF proposes possible improvements in the information published and provided in advance to improve the quality of the projections and increase transparency in the PRI calculation.

**The medium-term macroeconomic variables used for the projections should be published.** The MEySS report indicates that it has used its own model to project contributors and revenue by regime and concepts specific to each of them, also incorporating legal and management changes that will be implemented with certainty in the projection period, but does not provide details on the methodology or macroeconomic framework used. It would be desirable to publish the figures used and which coincide with the most recent multiannual macroeconomic picture published by the Government. On this occasion, and because of its closeness to publication, the macroeconomic picture should be consistent with the information published in the 2017-2020 Stability Program Update (APE)<sup>4</sup>.

**In addition, the number of pensions should correspond to the annual average rather than to the data on 31 December.** In Annex 3 of the Expert Committee's Report on the Sustainability Factor (2013), where the PRI theoretical formula is derived, the expenditure in t+1 is defined as the expenditure in year t increased by the revaluation, the evolution of the number of pensions and the substitution effect. In order for this identity to be met, the average number of pensions in the year must be used. The substitution effect should also be calculated on the average pension for the year and not on the average at the end of the year. In any case, the differences of using one or the other value are small, especially considering that the means of eleven years are used.

**On the other hand, the MEySS needs to explain the calculation methodology used for the past substitution effect and its future projections.** The substitution effect is defined as the increase of the average pension in the absence of revaluation. The calculation suggested by the MEySS is a reasonable approximation that should be made public. The same should be done for the variation of the average pension, not explained by the revaluation rate, i.e.:

$$1 + g_{S,t} = \frac{1 + \Delta Pm_t}{1 + IRP_t}$$

Where  $g_{S,t}$  is the substitution effect of year t,  $\Delta Pm_t$  is the annual rate of change of the average pension in t, expressed for one year. However, as far as future projections are concerned, this approximation is not the most adequate for projection years, since the substitution effect in year t+1 is independent of the revaluation of the average pension to be applied in said year. In fact, for subsequent periods, it is necessary to know the future revaluations, which are in turn an endogenous component of the PRI formula. Therefore, an alternative to the form of calculation used by the MEySS, which has the virtue of avoiding the problem of endogeneity in t+1, is based on the calculation of the average pension (PmSinReval) in year t+1:

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<sup>4</sup> As a contrast to the results of the baseline scenario, this report presents two complementary econometric models that present the evolution of the aggregate contributions, from a relatively pessimistic macroeconomic scenario and a more optimistic one. Scenario 1 would be a more pessimistic scenario (unemployment rate decreases only to 13.1% by 2022) and Scenario 2 is equivalent to the APE forecast (unemployment rate of 11.4% in 2022). However, it should be noted that the series of nominal GDP in Scenario 2 differs from that used in the APE. Nor are the values of the rest of the macroeconomic variables used – employment compensation equivalent to full-time and number of jobs equivalent to full-time – nor is the specification of the coefficients and their adjustments provided, but only some particular statistics on the global benefits of the setting. Although the information provided in this regard is still very low, there is a considerable improvement over previous years.

$$PmSinReval_{t+1} = \frac{Alt_{t+1} * PmAlt_{t+1} + P_t * Pm_t - Baj_{t+1} * PmBaj_{t+1}}{Alt_{t+1} + P_t - Baj_{t+1}}$$

Where *Alt*, *P* and *Baj*, refer to the number of new pensions, the pensions in force, and the discharges, respectively, and *PmAlt*, *Pm* and *PmBaj* indicate the average number of new pensions, current pensions and discharges, respectively. In this manner, the substitution effect can be estimated in year t+1 knowing only the PRI until t. Similarly, for any period t+i+1, it is possible to know the substitution effect with PRI data up to t+1. From the above formula, the substitution effect ( $g_{S,t+1}$ ) can be calculated as:

$$g_{S,t+1} = \frac{PmSinReval_{t+1}}{Pm_t} - 1$$

**A full evaluation of the substitution effect provided by the MEySS would need to know the forecasts of all the series that intervene in its calculation.** In particular, the transparency of the exercise would increase if the inflows and outflows of pensions were known for each forecast year. The projection of the number of pensions is another determinant element of the PRI. For a given year, the number of pensions is the number in force in the previous period, plus new registrations minus any discharges during the current year. A detailed evaluation by AIReF necessarily requires the MEySS to publish the series of registrations and discharges projected and used in its calculations, possibly disaggregated by type of pension (retirement, widowhood, permanent disability, orphanhood, and family favour). Also, the valuation would be more robust if AIReF had the MEySS projections for the average number of registrations, discharges and current pensions.

**The MEySS should publish the method that has been used in resolving the PRI formula's circularity problem.** The resulting PRI for a period t depends, inter alia, on the expenditure in t, which in turn also depends on the PRI in t (and this in turn on the expenditure and PRI of future periods). The PRI variable is a function of itself and its resolution presents a problem of circularity. The 2015 and 2016 Opinions on the PRI have already shown the absence of information regarding the resolution method used by the MEySS. For this reason, AIReF has proposed, published and detailed two alternative methods to deal with the formula's circularity, with very similar results<sup>5</sup>.

**Finally, AIReF highly values the MEySS publication of the series used to calculate the PRI, although transparency could be improved by explaining the method used to project the underlying revenue and expenditure variables.**

<sup>5</sup> See the [2015 PRI Opinion](#) and the [working document "The PRI, proposals to resolve the circularity problem"](#)

## 4. Results for the effective PRI

According to the MEySS, the result of applying the PRI formula within the legally established limits is an effective PRI (or with legal limits) of 0.25% for 2017. In the 2017-2022 period, revenue grew 4%, more than the 2.7% growth in expenditure, but this positive differential in favour of revenue is insufficient to compensate for the negative differential accumulated during the crisis years. Therefore, the 2017 PRI is 0.25%.

TABLE I. VARIABLES FOR THE CALCULATION OF THE PRI WITH LIMITS (MEySS)

	gI (1)	gP (2)	gS (3)	I (4)	G (5)	gG (6)	Balance/GDP (7)	gP+gS+PRI (8)	PRI (9)
2012	-2.48%	1.54%	1.60%	109,582	115,292	3.70%	-0.55	4.20%	1.00%
2013	0.23%	1.62%	1.70%	109,839	119,882	3.98%	-0.98	5.41%	2.00%
2014	0.62%	1.40%	1.50%	110,515	123,936	3.38%	-1.29	3.18%	0.25%
2015	0.75%	0.77%	1.60%	111,342	127,951	3.24%	-1.54	2.64%	0.25%
2016	1.98%	1.31%	1.60%	113,551	132,250	3.36%	-1.68	3.19%	0.25%
2017(P)	5.71%	1.10%	1.70%	120,034	136,740	3.40%	-1.43	3.08%	0.25%
2018(P)	3.70%	0.92%	1.52%	124,471	140,294	2.60%	-1.30	2.71%	0.25%
2019(P)	3.85%	0.93%	1.52%	129,265	143,816	2.51%	-1.15	2.72%	0.25%
2020(P)	4.04%	0.98%	1.52%	134,487	147,449	2.53%	-0.98	2.77%	0.25%
2021(P)	3.46%	1.05%	1.52%	139,140	151,190	2.54%	-0.88	2.84%	0.25%
2022(P)	2.98%	1.07%	1.52%	143,289	155,008	2.53%	-0.83	2.86%	0.25%
<b>2012_22</b>	<b>2.26%</b>	<b>1.15%</b>	<b>1.57%</b>	<b>121,745</b>	<b>135,220</b>	<b>3.07%</b>	<b>-1.15</b>	<b>3.24%</b>	<b>0.48%</b>
2017_22	3.96%	1.01%	1.55%	131,532	145,616	2.68%	-1.10	2.83%	0.25%

**Nota:**

(1) Revenue (% change)

(3) Substitution effect (%)

(5) Total Expenditure (M€)

(2) Number of pensions (% change)

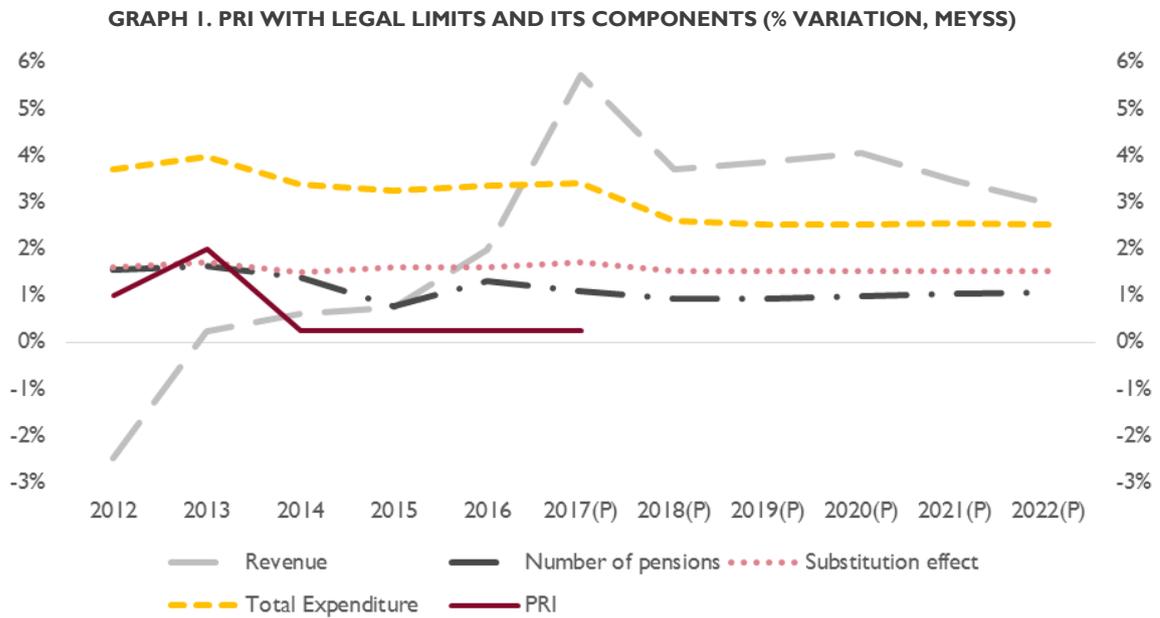
(4) Total Revenue (M€)

(6) Expenditure (% change)

Source: MEySS and own calculations

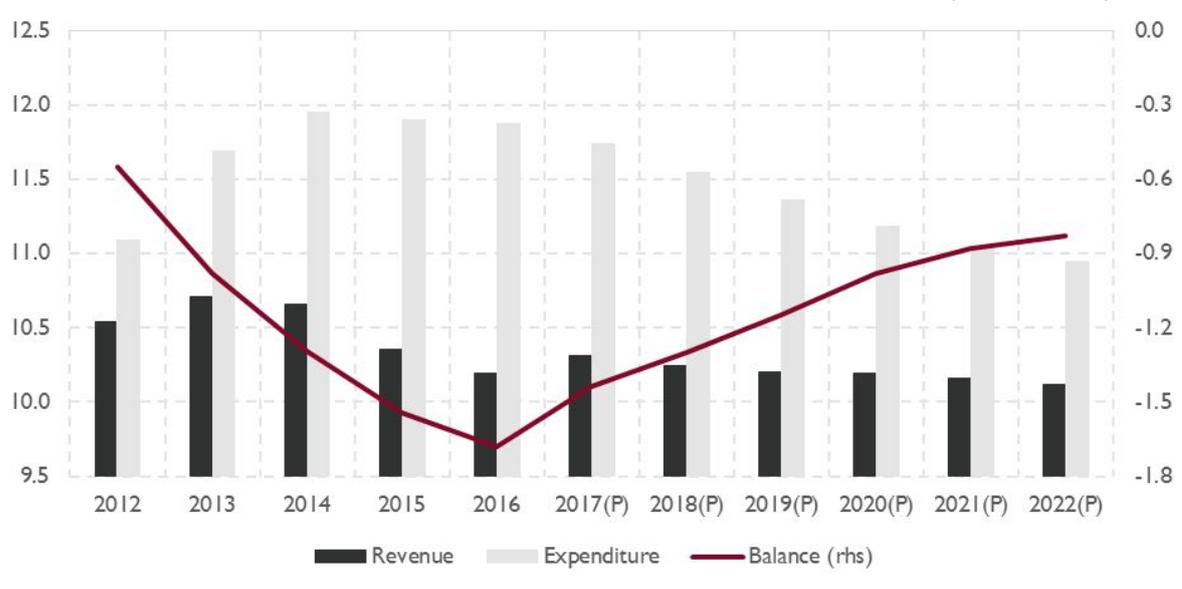
For the 2018-2022 period, the effective PRI continues to be 0.25%. According to our own calculations, it seems that the MEySS model obtains a PRI of 0.25% in each one of the years of the 2018-2022 period, mainly due to the large gap in the starting balance. Because the PRI formula uses mobile averages from t-5 to t+5, to correctly assess the 2017 PRI calculation

provided by the MEySS, it would be desirable to have data on the underlying components at least until 2027 (i.e. five additional years beyond 2022).



From the information provided by the MEySS, an implicit adjustment in the balance of the Social Security Funds (SSF) is derived that is slower than that established in both the last APE and in the stability objectives approved by the Council of Ministers last July 3rd, subsequently amended on July 7th. For the 2017-2020 period, the government has set an improvement target of 1.1% GDP, in cumulative terms for the SSF. However, according to the MEySS information, the Social Security System adjustment associated to the PRI (which represents more than 80% of the SSF expenditure) until 2020 accumulates approximately 0.7% GDP. Although the 0.25% PRI tends to reduce the expenditure-to-GDP ratio by almost one percentage point, this contraction is clearly insufficient to close the initial gap of 1.7% GDP. Thus, in 2022, there persists a deficit of 0.8% GDP for the whole system, according to the MEySS.

**GRAPH 2. REVENUE, EXPENDITURE AND BALANCE FOR PRI WITH LEGAL LIMITS (%GDP, MEYSS)**



**AIReF applies an iterative solution method similar to the one apparently used by the MEySS, therefore it is possible that the main differences lie in the hypotheses about the exogenous variables.** It is not possible to completely rule out differences in the calculation of the PRI between the methods used by MEySS and AIReF since the latter did not have access to the details of the calculation methodology. The annex provides details on the iterative model used by AIReF.

**The PRI with legal limits obtained with the AIReF proposal is established, like the MEySS scenario, at 0.25%, as the system does not manage to close the deficit over the simulation period.** The results of the effective PRI are summarized in the following table:

**TABLE 2. VARIABLES FOR THE CALCULATION OF THE PRI WITH LEGAL LIMITS (AIREF)**

	gI	gP	gS	I	G	gG	Balance/GDP	gP+gS+PRI	PRI
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2012	-2.48%	1.54%	1.60%	109,582	115,292	3.70%	-0.55	4.20%	1.00%
2013	0.23%	1.62%	1.70%	109,839	119,882	3.98%	-0.98	5.42%	2.00%
2014	0.62%	1.40%	1.50%	110,515	123,936	3.38%	-1.29	3.18%	0.25%
2015	0.75%	0.77%	1.60%	111,342	127,951	3.24%	-1.54	2.64%	0.25%
2016	1.98%	1.31%	1.60%	113,551	132,250	3.36%	-1.68	3.19%	0.25%
2017(P)	3.11%	1.21%	1.52%	117,086	136,740	3.40%	-1.69	3.01%	0.25%
2018(P)	3.88%	1.23%	1.48%	121,628	140,738	2.92%	-1.57	2.98%	0.25%
2019(P)	4.07%	1.23%	1.41%	126,573	144,759	2.86%	-1.44	2.92%	0.25%
2020(P)	4.01%	1.24%	1.34%	131,647	148,800	2.79%	-1.30	2.86%	0.25%
2021(P)	3.64%	1.26%	1.29%	136,441	152,919	2.77%	-1.20	2.83%	0.25%
2022(P)	3.33%	1.31%	1.26%	140,981	157,125	2.75%	-1.14	2.84%	0.25%
<b>2012_22</b>	<b>2.10%</b>	<b>1.28%</b>	<b>1.48%</b>	<b>120,357</b>	<b>135,759</b>	<b>3.20%</b>	<b>-1.31</b>	<b>3.28%</b>	<b>0.48%</b>
2017_22	3.67%	1.25%	1.38%	128,795	146,682	2.91%	-1.39	2.90%	0.25%

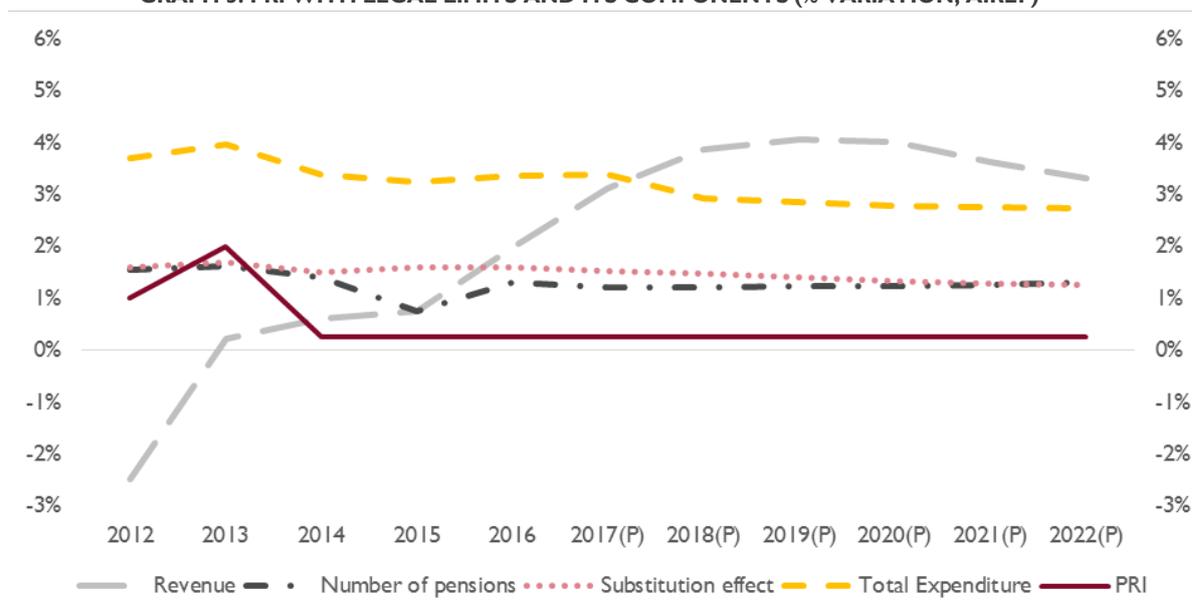
**Nota:**

- (1) Revenue (% change) (3) Substitution effect (%) (5) Total Expenditure (M€)
- (2) Number of pensions (% change) (4) Total Revenue (M€) (6) Expenditure (% change)

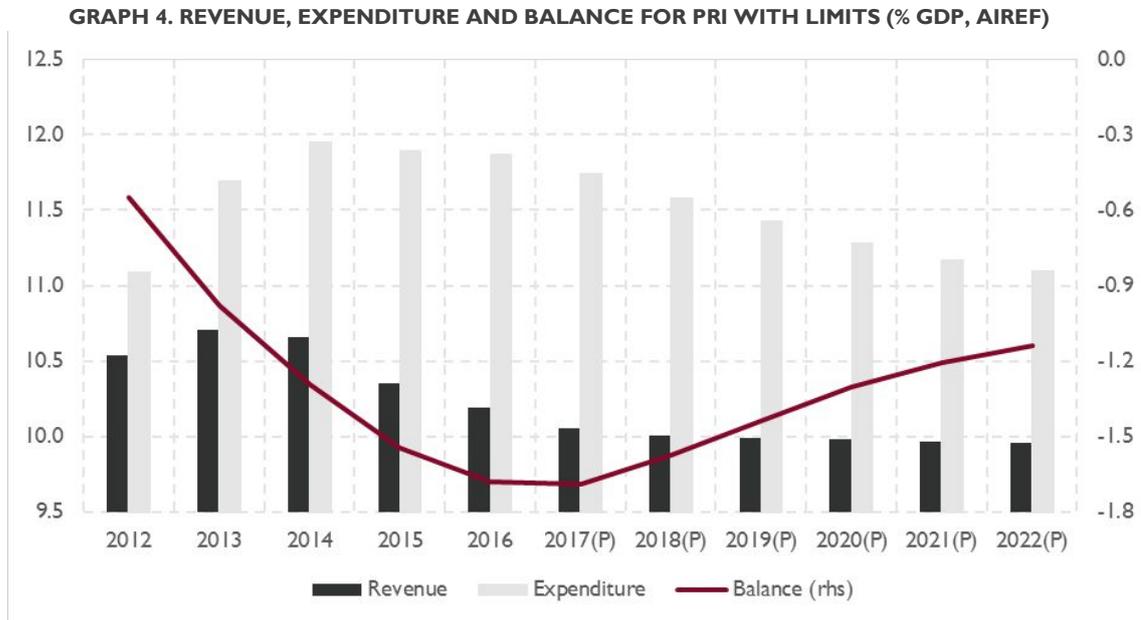
Source: MEySS and own calculations

Like the MEySS, AIReF forecasts a growth differential of income over expenditure for the 2017-2022 forecast period, although of a smaller magnitude. The smaller growth differential is explained by the fact that AIReF expects a more moderate increase in income and a higher number of pensions.

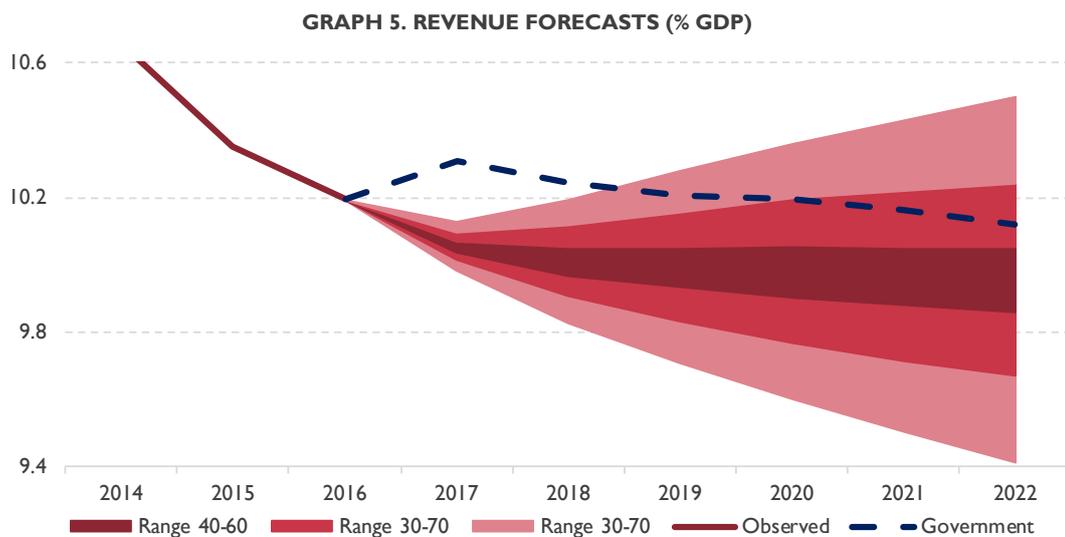
**GRAPH 3. PRI WITH LEGAL LIMITS AND ITS COMPONENTS (% VARIATION, AIREF)**



With a PRI of 0.25%, AIReF confirms that the expenditure to GDP ratio tends to contract, although this is insufficient to close the deficit at the end of the forecast period. Against the balance of -0.8% GDP in 2022 projected by the MEySS, AIReF forecasts a balance of -1.1%, due to differences in the starting hypotheses.

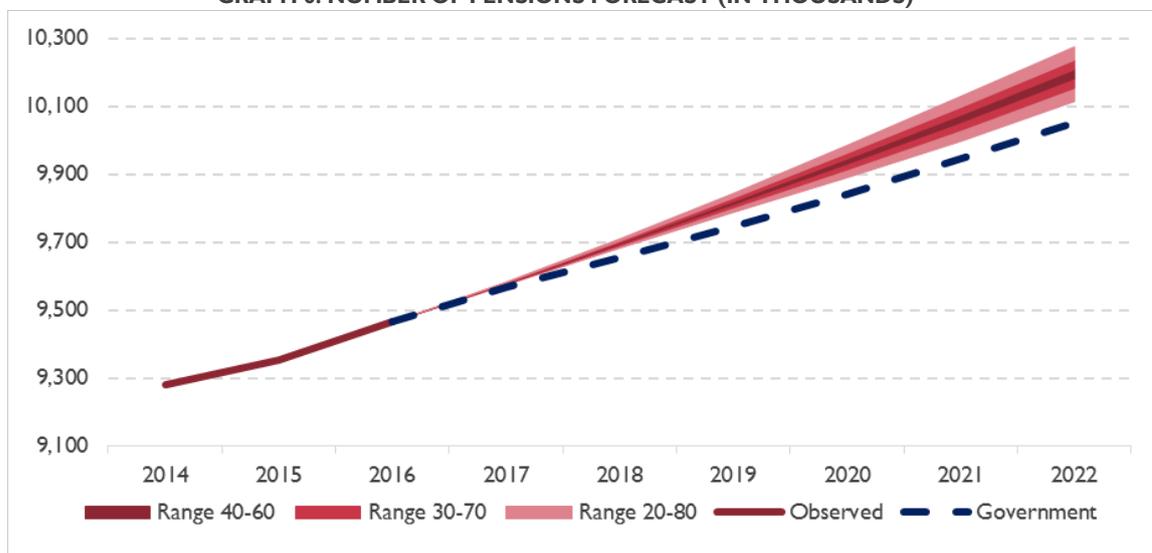


The MEySS revenue trend is very unlikely in 2017 and 2018. Later, the forecasts gradually become more realistic, converging towards AIReF’s central forecast towards the end of the period. The MEySS revenue forecasts are outside the 20%-80% confidence interval of the AIReF forecasts for the 2017-2018 period. From 2019 onwards, the greater breadth of the uncertainty interval and the convergence of the MEySS revenue forecasts with the average AIReF forecast leads the probability of obtaining a lower revenue level than the MEySS to decrease from 90% in 2017 (outside the confidence intervals) to 60% at the end of the period.



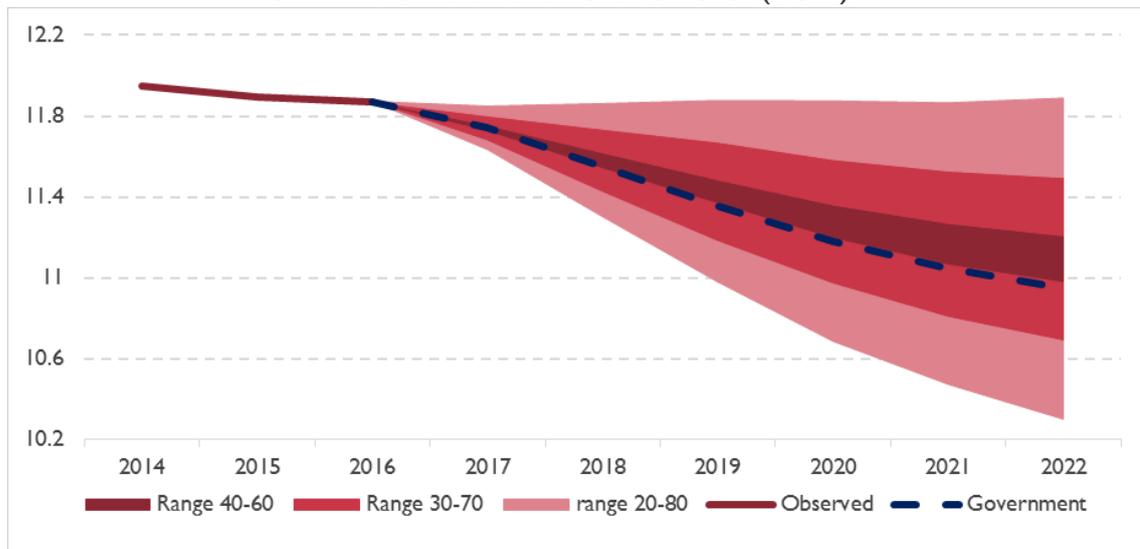
The evolution of the number of pensions is considered very unlikely, with growth rates systematically lower than those obtained by AIReF’s proposed method and outside the 20-60% confidence intervals for 2018-2022. AIReF has forecasted the number of pensions, separately projecting the inflows and outflows for retirement, widowhood and disability. The inflows forecast takes into account the evolution of the demography, the behaviour observed to constant legislation and the impact of regulatory changes, according to the detail found in the annex. Outflows mainly correspond to the demography and the historical evolution of casualties for reasons other than death. Regarding the projection period, the largest difference is observed in the calculation of the number of pensions, for which the government estimates an annual growth of 1%, compared to the 1.3% projected by AIReF. Note that the over-65 population will grow 1.6% during the same period.

**GRAPH 6. NUMBER OF PENSIONS FORECAST (IN THOUSANDS)**



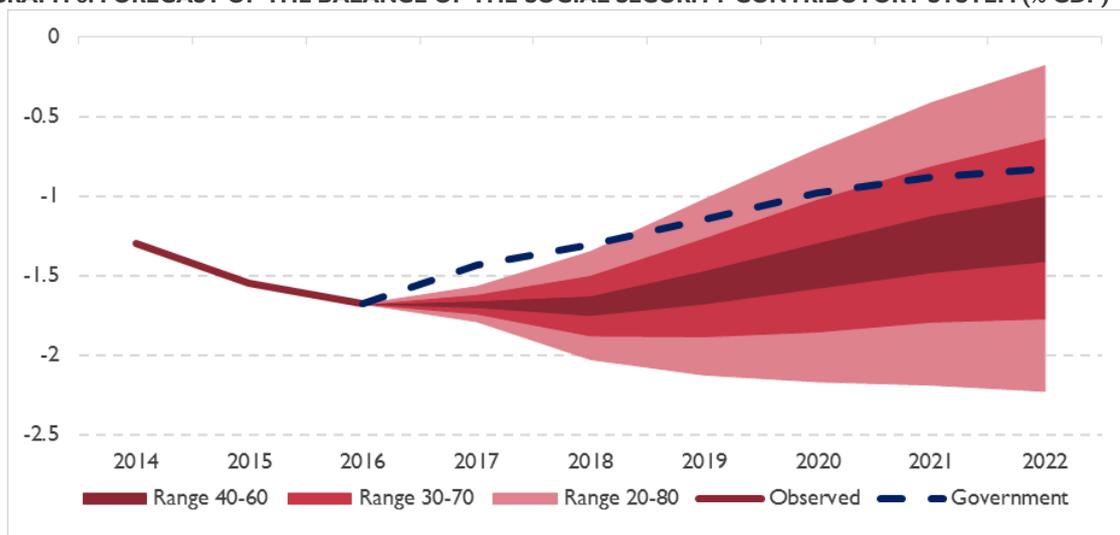
The MEySS expenditure forecasts for the 2018-2022 period are below the AIReF estimates and are considered unlikely, mainly due to the evolution of the number of pensions. The AIReF forecast for the 2017-2022 period shows an evolution in the number of pensions higher than that predicted by the MEySS (1.2% compared to the 1% annual average). The substitution effect is similar in both cases (1.5% from the MEySS vs. 1.6% from AIReF), but in AIReF scenario, there is a decreasing path (stable according to the MEySS), linked to the expected deceleration in the growth of the average retirement pension in the years of progressive implementation of the 2011 reform and the 2019 sustainability factor. The average PRI is identical in both cases, equal to 0.25%.

**GRAPH 7. TOTAL EXPENDITURE FORECAST (% GDP)**



The MEySS deficit forecast for 2017 and 2018 remains outside the confidence intervals of the AIReF forecasts and, therefore, are considered very unlikely and optimistic in the short-term. Even with the progressive improvement in subsequent years, according to the AIReF model, there is an approximately 70% probability of registering a deficit in the Social Security contributory system greater than that forecasted by the MEySS. The information provided by the MEySS projects a deficit for the 2017-2022 period as a whole, which is gradually reduced. As shown in figure 6, the deficit in the Social Security contributory system envisaged by the MEySS is gradually reduced, reaching a deficit of 0.8% GDP in 2022, three tenths below the central forecast of the AIReF models.

**GRAPH 8. FORECAST OF THE BALANCE OF THE SOCIAL SECURITY CONTRIBUTORY SYSTEM (% GDP)**



## 5. Results for the theoretical PRI

The PRI, besides being the last mechanism to guarantee the sustainability of the system, was conceived as a signal on the existence and magnitude of the financial imbalance of the Social Security system. As noted in the Report from the Committee of Experts on the Sustainability Factor (2013)<sup>6</sup>, its “mere calculation, even before it has been applied, already has a very high intrinsic value in that it supposes the true comprehensible image of the existence, or not, of a deficit in the long term that is necessary to correct”. The transparency framework established by the theoretical PRI (or without legal limits) allows authorities and citizens to respond in advance to demographic and economic challenges. In a context of large deficits, the establishment of a minimum limit for the sufficiency of benefits, to which the result of the PRI formula should converge, weakens the signalling function of sustainability. Therefore, it is advisable to report on the value resulting from applying said formula without considering the legal limits.

The MEySS appears to use the data obtained in the effective PRI to calculate the theoretical PRI. Table 1 shows that the PRI obtained for 2017 is approximately -3.0%

$$PRI_{17} = \bar{g}_{I,17} - \bar{g}_{P,17} - \bar{g}_{S,17} + \alpha * \left[ \frac{I_{17}^*}{G_{17}^*} - 1 \right]$$

$$PRI_{17} = 2,26\% - 1,15\% - 1,57\% + 0,25 * \left[ \frac{121.745}{135.220} - 1 \right]$$

$$PRI_{17} = -0,46\% - 2,49\% = -2,96\%$$

**This method has limitations.** On the one hand, it implicitly uses two alternative values for the 2017 PRI: the dependent variable determines a PRI of -3%, while the level of expenditure in 2017 represents a revaluation of 0.25%. On the other hand, the theoretical PRI computed for 2017 crucially depends on the limit set by the legislation<sup>7</sup>, which distorts the PRI information on the sustainability of the system, when ideally, it should not be distorted by discretionary limits to improve sufficiency.

**Although the MEySS approach is a reasonable approximation given the current and projected revenue and expenditure values, the possibility of applying the iterative method using an unrestricted PRI should be analysed.** In this case, the resulting negative PRI would lead to a significant contraction of the average pension and containment of the aggregate expenditure in pensions for the same year and future years. In addition, in successive years, the substitution effect would tend to widen, due to the deceleration of outgoing pensions. The publication of these results could contribute to a more effective public debate about the consequences of applying the necessary PRI, without limits, to ensure the financial sustainability of the system. In any case, given the current and projected revenue and expenditure values, AIReF understands that the method employed is a reasonable approximation to resolve the PRI formula and that the values obtained by the MEySS method are not very far from those derived from the proposed solution.

<sup>6</sup> [Informe del Comité de Expertos sobre el factor de sostenibilidad del sistema público de pensiones](#)

<sup>7</sup> With this resolution method, as the lower limit increases, the PRI increases in absolute value without limits.

Alternatively, the MEySS could consider a modification to the PRI formula to eliminate the circularity associated with its results, but maintaining the mechanism of smoothing the impact of the economic cycle. In this manner, the transparency in the calculation and the certainty in the forecasts would be increased, thus contributing to the understanding of the contributors and pensioners, who could make more informed decisions on employment, savings and consumption, depending on the expected evolution of the PRI. An alternative to consider, for example, is to evaluate the benefits and costs of using a formula whose moving averages are no longer centred on the year of calculation but only uses data prior to the revaluation period (for which there is certain information) and the year for which the budget is being prepared<sup>8</sup>.

Using an iterative solution, AIReF obtains a theoretical PRI of -2.9%. AIReF has developed an alternative scenario in which the PRI is not subject to restrictions. The results are shown in Table 3.

**TABLE 3. VARIABLES FOR THE CALCULATION OF THE PRI WITHOUT LIMITS (AIReF)**

	gI	gP	gS	I	G	gG	Balance/GDP	gP+gS+PRI	PRI	PRI rates	PRI balance
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2012	-2.48%	1.54%	1.60%	109,582	115,292	3.70%	-0.55	4.20%	1.00%		
2013	0.23%	1.62%	1.70%	109,839	119,882	3.98%	-0.98	5.42%	2.00%		
2014	0.62%	1.40%	1.50%	110,515	123,936	3.38%	-1.29	3.18%	0.25%		
2015	0.75%	0.77%	1.60%	111,342	127,951	3.24%	-1.54	2.64%	0.25%		
2016	1.98%	1.31%	1.60%	113,551	132,250	3.36%	-1.68	3.19%	0.25%		
2017(P)	3.11%	1.21%	1.52%	117,086	132,908	0.50%	-1.36	-0.25%	-2.92%	-0.89%	-0.02
2018(P)	3.88%	1.23%	1.71%	121,628	133,925	0.77%	-1.01	0.53%	-2.36%	-0.39%	-0.02
2019(P)	4.07%	1.23%	1.81%	126,573	135,571	1.23%	-0.71	1.05%	-1.95%	-0.13%	-0.02
2020(P)	4.01%	1.24%	1.88%	131,647	137,802	1.65%	-0.47	1.54%	-1.55%	0.05%	-0.02
2021(P)	3.64%	1.26%	1.92%	136,441	140,667	2.08%	-0.31	2.03%	-1.14%	0.19%	-0.01
2022(P)	3.33%	1.31%	1.94%	140,981	144,142	2.47%	-0.22	2.51%	-0.75%	0.27%	-0.01
<b>2012_22</b>	<b>2.10%</b>	<b>1.28%</b>	<b>1.71%</b>	<b>120,357</b>	<b>131,028</b>	<b>2.40%</b>	<b>-0.92</b>	<b>2.37%</b>	<b>-0.63%</b>	-	-
2017_22	3.67%	1.25%	1.80%	128,795	137,447	1.45%	-0.68	1.23%	-1.78%	-0.15%	-0.02

Nota:

- (1) Revenue (% change) (3) Substitution effect (%) (5) Total Expenditure (M€) (8) IRP rates =  $\bar{g}_I - \bar{g}_P - \bar{g}_S$   
 (2) Number of pensions (% change) (4) Total Revenue (M€) (6) Expenditure (% change) (9) IRP balance =  $\alpha * (I/G)^* - 1$

Source: MEySS and own calculations

Compared to the resolution method adopted by the MEySS<sup>9</sup>, in this case, the PRI used in the model (column (9) of table 3, corresponding to 2017) coincides with the ex-post calculated PRI.

$$PRI_{17} = \bar{g}_{I,17} - \bar{g}_{P,17} - \bar{g}_{S,17} + \alpha * \left[ \frac{I_{17}^*}{G_{17}^*} - 1 \right]$$

<sup>8</sup> AIReF's preliminary calculations point out that the PRI without limits for 2017, calculated on the average for 2007-2017 from its determinants would also result in a negative value, although lower in absolute value to 3%.

<sup>9</sup> Using the AIReF assumptions (Table 2) and the resolution method used by the MEySS, the resulting 2017 PRI would be -3.5%, vs. the 3% detailed in the SGB:

$$PRI_{17} = \bar{g}_{I,17} - \bar{g}_{P,17} - \bar{g}_{S,17} + \alpha * \left[ \frac{I_{17}^*}{G_{17}^*} - 1 \right]$$

$$PRI_{17} = 2,10\% - 1,28\% - 1,48\% + 0,25 * \left[ \frac{120,357}{135,759} - 1 \right]$$

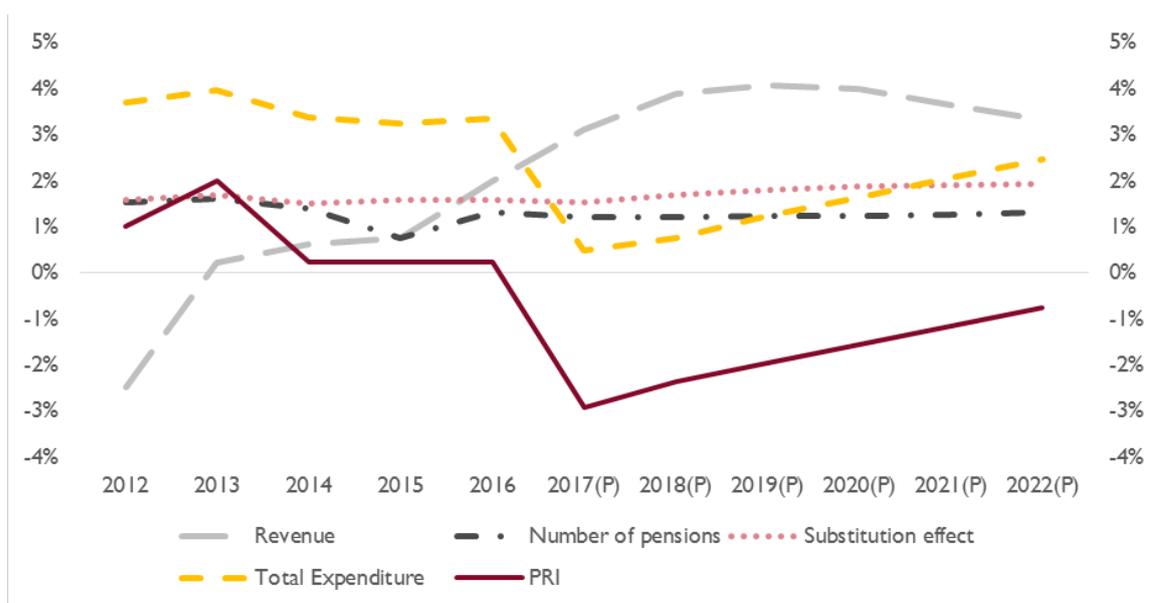
$$PRI_{17} = -0,66\% - 2,84\% = -3,50\%$$

$$PRI_{17} = 2,10\% - 1,28\% - 1,71\% + 0,25 * \left[ \frac{120.357}{131.013} - 1 \right]$$

$$PRI_{17} = -0,89\% - 2,04\% = -2,92\%$$

**In the following years, the PRI decreases in absolute terms, but does not reach positive values in the medium term.** In this scenario, the substitution effect, far from remaining relatively stable around its starting level (as it does in the MEySS scenario) tends to increase. This occurs because the very negative PRIs tend to reduce the average total pension and the average outgoing pension in the first years of the projection, causing a distancing from the average pension from new entrants. Pension expenditure will also contract slightly in 2017, as the -2.9% revaluation is greater than the sum of the growth in the number of pensions (1.2%) and the substitution effect (1.5%). Note that the growth of total expenditure in addition to pension expenditure includes a residual component from other expenses, which represents about 9% of total system expenditure. By 2017, a higher growth of these expenditures is expected to be greater than 5%, which sustains the evolution of total expenditure in positive territory.

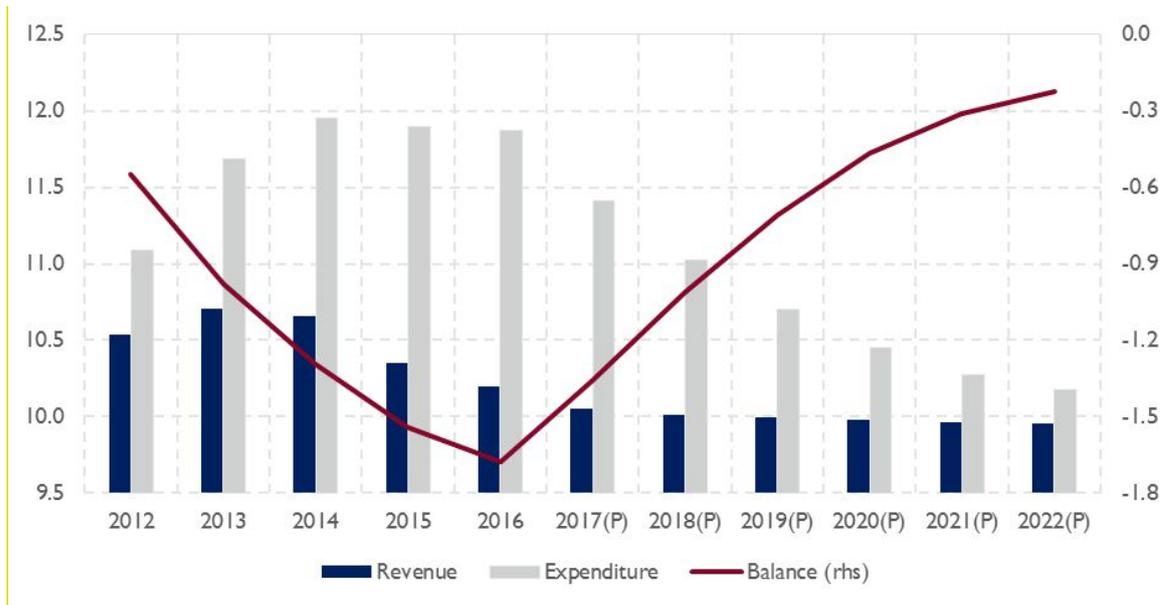
**GRAPH 9. PRI WITHOUT LEGAL LIMITS AND ITS COMPONENTS (% VARIATION, AIREF)**



**The theoretical PRI, in its balance component, allows financial equilibrium to be achieved in a period of fifteen years<sup>10</sup>, so that in 2022, even with negative revaluations, Social Security would continue to present a deficit.** According to the AIRcF assumptions and methodologies, with an unrestricted PRI, the ratio of expenditure to GDP is reduced by 1.2% GDP in the forecast period, allowing a deficit of 0.2% GDP in 2022.

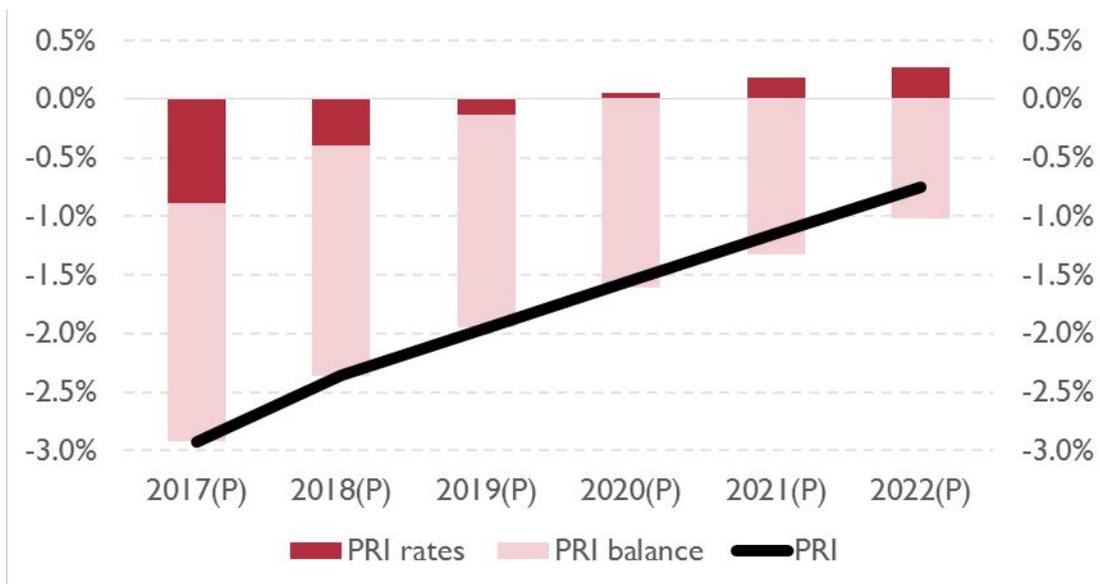
<sup>10</sup> With an alpha=0.25 and a PRI rate component equal to zero, in 6 years (2017-2022) 82% of the current gap would be corrected. [Working Paper 1/2015](#)

**GRAPH 10. REVENUE, EXPENDITURE AND BALANCE FOR PRI WITHOUT LEGAL LIMITS (% VARIATION, AIREF)**



If the theoretical PRI is disaggregated into a rate component and a balance component (columns 10 and 11 of table 3), it can be seen that the balance component is the one that most contributes to generating a negative PRI in the first years of the projection, reducing its contribution as the financial imbalance is corrected. It is expected, however, that the rate component tends to become increasingly negative starting from 2027, when the largest amount of baby boomers begins to retire (which slightly accelerates the growth in the number of pensions) and the 2011 Reform transitional period ends (which should have contained until then the growth of the average pension from new entrants and, therefore, the substitution effect).

**GRAPH 11. PRI WITHOUT LEGAL LIMITS AND ITS COMPONENTS (% VARIATION)**



## 6. AIReF's opinion

The analysis conducted by AIReF allows it to conclude that it is appropriate to apply the minimum increase of 0.25% to the contributory pensions in 2017, as it has been included in the 2017 Law on the State General Budget. Although its content should be further detailed, given the expected evolution of revenue and expenditure of the pension system in the medium term, the method applied by the MEySS is considered adequate to estimate the PRI with limits applicable in 2017.

AIReF has verified that, with the values provided by the MEySS for the PRI with limits, the result from applying the formula without limits for 2017 results in a theoretical PRI of -3%. However, the MEySS deficit forecast supporting its PRI estimate is considered highly unlikely in the 2017-2018 period and unlikely for 2022. Therefore, the PRI without limits resulting from applying the MEySS methodology and more realistic data would be somewhat less than 3%. Thus, if the values projected by AIReF and the method applied by the MEySS were used, the result would be a 2017 PRI of -3.5%. If the AIReF forecasts and the iterative resolution method are used, without taking into account the thresholds defined in the Law, the PRI computed for 2017 would be -2.9%<sup>11</sup>. In any case, the PRI obtained is close to -3% and less than the 0.25% envisaged in the current legislation as the minimum increase applicable to the contributory Social Security and civil service pensions.

TABLE 4. 2017 PRI WITHOUT LIMITS FOR DIFFERENT FORECASTS AND METHODOLOGIES

		Methodology	
		MEySS	AIReF
Forecasts	MEySS	-3.0%	----
	AIReF	-3.5%	-2.9%

This year, the MEySS has significantly improved transparency in the PRI calculation. AIReF has discussed in previous Opinions that it was necessary to provide greater transparency in the calculation of the PRI, to improve the public's understanding of the pension revaluation mechanism. This year, important progress has been made in this regard, especially with the publication of the SGB draft of the information needed to estimate the 2017 PRI. In order to further improve transparency, AIReF makes the following proposals:

- 
1. **Complete the information provided:**
    - a. **Provide the macroeconomic series used, in order to replicate the central scenario of revenue evaluation, as well as alternate scenarios.**
    - b. **Detail the computation of the historical substitution effect and the estimation model of the future substitution effect.**
- 

<sup>11</sup> It is not possible to calculate the 2017 PRI with forecasts from the MEySS and AIReF methodology, since the iterative resolution requires the availability of series not provided by the MEySS (such as the number of registrations and discharges) and a sufficiently long time horizon (if possible, until 2050).

- c. Explain the method of projecting the number of pensions, identifying the number of inflows and outflows each year, preferably by pension class.***
  - d. Publish the mortality tables on the pensioner population and its future projections.***
- 

The Government has not explained the method used to solve the circularity of the formula, so the AIReF reiterates its suggestion of good practice to the Government:

- 2. Publicly explain the method used to resolve the circularity of the mathematical formula for calculating the PRI, which requires presenting:***
  - a. The iterative procedure used.***
  - b. Long-term forecasts (if possible, to 2050) of the variables that define the PRI, including the expected evolution for the PRI.***
  - c. Results for the variables that determine the PRI in an alternative revaluation scenario without limits.***
- 3. Evaluate a reformulation of the PRI that eliminates the circularity.***

On the other hand, in previous Opinions, AIReF proposed to improve the PRI formula using the consolidated revenue and expenditure from the Social Security System and not the aggregates, as currently established by the General Law on Social Security. The obligation of the current legislation to use aggregate terms with operations that are revenue for one entity and an expenditure for another leads to drawbacks when applying the PRI calculation formula. First, the criterion for projecting these operations must be the same in terms of revenue and expenditure, which means that these items must be identified. On the other hand, the last component of the formula is systematically lower when using aggregate data, which reduces the pace of adjustment in times of deficit and leads to a lower revaluation in times of surplus. The MEySS calculates the PRI using the consolidated revenue and expenditure figures in a manner consistent with the improvement proposed by the AIReF. However, current legislation still requires the calculation to use aggregate terms. Consequently, AIReF makes the following good practice suggestion:

- 4. Evaluate the modification of the current legislation so that the formula uses the consolidated revenue and expenditure values from the Social Security System.***
-